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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,451

07/18/2006

Michael Bartsch

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EXAMINER

KOSACK, JOSEPH R

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,451	<b>Applicant(s)</b> BARTSCH ET AL.	
	<b>Examiner</b> Joseph R. Kosack	<b>Art Unit</b> 1626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Claims 1-5 are pending in the instant application.

#### ***Previous Claim Rejections - 35 USC § 112***

Claims 1-5 were previously rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps.

The Applicant has traversed the rejection on the grounds that the claims would be understood to one of ordinary skill without additional steps.

The Examiner respectfully disagrees. The claims are drawn to a process for hydrocyanating 1,3-butadiene over at least one nickel(0) catalyst having phosphorus ligands, but fails to detail a step after the 1,3-butadiene is generated to hydrocyanate the 1,3-butadiene. Additionally, the only examples in the specification are drawn to the hydrocyanation reaction, but not the dehydrogenation steps. Therefore, the hydrocyanation reaction is an essential step and feature in the invention and needs to be detailed in the process steps. This can be possibly be done by adding an additional step to react the 1,3-butadiene from step E with the nickel(0) catalyst in a hydrocyanation reaction as long as the amendment does not introduce new matter. The rejection is maintained.

#### ***Previous Claim Rejections - 35 USC § 103***

Claims 1-5 were previously rejected under 35 U.S.C. 103(a) as being unpatentable over Watson (GB-628686) in view of Arakawa et al. (USPN 4,504,692) and Fischer et al. (USPN 6,242,633).

The Applicant has traversed the rejection on the grounds that the references do not motivate the person of ordinary skill in the art to perform the second dehydrogenation step oxidatively, that the process has a higher yield of butadiene, and that the prior art did not know whether the byproducts of the oxidative dehydrogenation would interfere with the hydrocyanation catalyst.

The Examiner respectfully disagrees. The Applicant cites page 12, lines 31-33 to show that the yield of butadiene is higher, which corresponds to page 11, lines 13-15 of the English translation in the application file. However, the citation does not indicate how much higher the yield is that previous processes. Additionally, the Applicant cites page 13, lines 11-17, which corresponds to page 11, lines 28-35 to indicate that oxygenates which are formed as biproducts may be present. However, the specification teaches that there may be 0% oxygenates in the product mixture. Therefore, there may be no oxygenates interfering with the nickel(0) catalyst for the hydrocyanation. The Applicant mentions that the distillation step advantageously removes a 1,3-butadiene/n-butane azeotrope; however the step does not require that an azeotrope or mixture be present.

Finally, Fischer et al. teaches a hydrocyanation reaction with a nickel(0) catalyst with phosphorus-containing ligands. Fischer et al. bridges the gap by providing the hydrocyanation step to use with the butadiene prepared by the process of Watson modified by Arakawa et al.

Therefore, the Applicant's arguments have been considered fully by the Examiner, but were not found to be persuasive. The rejection is maintained.

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***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps for the actual hydrocyanation reaction.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watson (GB-628686) in view of Arakawa et al. (USPN 4,504,692) and Fischer et al. (USPN 6,242,633).

Watson teaches the preparation of 1,3-butadiene from n-butane by dehydrogenating in two distinct dehydrogenation zones. See Example II on page 3 and claims 1-7 on page 4.

Watson does not teach where the 1,3-butadiene is present in 60-90%, where the n-butane is present in 40-10%, the hydrocyanation reaction, and where the second dehydrogenation is done oxidatively.

Watson teaches that the dehydrogenation catalyst can be regenerated by oxidation. See page 3. Hence, the person of ordinary skill in the art would deem that the dehydrogenation step may be done in the presence of oxygenous gas, such as air.

Arakawa et al. teach a dehydrogenation process to produce 1,3-butadiene from n-butane where the final product after distillation has 25% n-butane and 75% 1,3-butadiene. See Example 1, columns 10-12.

Fischer et al. teach the hydrocyanation reaction of 1,3-butadiene with a nickel(0) catalyst with phosphorus ligands. See Example 15, column 21.

Therefore, the person of ordinary skill in the art would take the two step process of Watson, use the advice of Watson to perform one dehydrogenation oxidatively in order to continuously recharge the catalyst, maximize the yields and perform the distillation step according to Arakawa et al., and use the final product in a hydrocyanation reaction according to Fischer et al. with a reasonable expectation of success. The motivation to combine the references would be to create an automated, continuous process which is preferred in industry.

### ***Conclusion***

Claims 1-5 are rejected.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph R. Kosack whose telephone number is (571)272-5575. The examiner can normally be reached on M-Th 6:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on (571)-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph R Kosack/  
Examiner, Art Unit 1626

/REI-TSANG SHIAO /  
Primary Examiner, Art Unit 1626